certainty as to the simplicity and origin of the pleasures affecting our different senses; and try by comparison of those pleasures which affect one sense, from objects whose principles are known as the ratios of sound, if other affections agreeable to others of our senses were owing to similar causes."

Sir Isaac Newton to Mr. Harrington:—

"You observe that the multiples hereof (viz. the lines 3, 4, and 5) furnish those ratios that afford pleasure to the eye in architectural designs, and that the ideas of beauty in surveying objects arise from their respective approximations to the simple constructions; and that the pleasure is more or less, as the approaches are nearer to the harmonic ratios: I believe you are right. Portions of circles are more or less agreeable as the segments give the idea of the perfect figure from which they are derived. Your examinations of the sides of polygons with rectangles certainly quadrate with the harmonic ratios. In fine, I am inclined to believe some general laws of the Creator prevailed with respect to the agreeable or unpleasing affections of all our senses; at least the supposition does not derogate from the wisdom or power of God, and seems highly consonant to the simplicity of the microcosm in general."—*Isaac Newton, May* 30, 1693.

Sir William Hamilton, professor of metaphysics in the University of Edinburgh, writes on the very view we are about to examine:—

"Your very elegant volume, 'Science of those Proportions,' &c., is to me extremely interesting, as affording an able contribution to what is the ancient, and, I conceive, the true theory of the beautiful. But though your doctrine coincides with the one prevalent through all antiquity, it appears to me quite independent and original in you."

We have, therefore, high authority for suspecting that it is in some simple mode of dealing with the elementary figures of geometry and the elementary ratios of numbers that a true way to the appreciation and the production of the beautiful in form will be found. And if so, here lies the key to that power of originally designing forms of unfading beauty, which the ancients did possess, and which the moderns do not possess, and which I humbly submit the designer of our day should never relax his efforts to recover.

Now it is precisely such a simple treatment and combination of elementary geometrical figures, and of the ratios they bear to each other, as is shadowed forth by these authorities, that Mr. Hay submits to our notice, and therefore it appears to me to demand our attention.

The basis of his theory is, that as the ear estimates instinctively the ratios of the numbers of vibrations forming the notes succeeding or combining with each other in melody or harmony, so is the eye capable of estimating the ratios of spaces and forms in succession or combination.

Further, that simplicity of proportion, which is a necessary element to the satisfaction of the ear, is essential to the gratification of the eye in objects of form.

That the eye is guided in its estimate by *direction* rather than distance, as the ear is by the number of vibrations rather than by the magnitude of vibrations.

Mr. Hay's view thus is, in brief, that a form is pleasing to the eye in the same degree as its fundamental angles bear to each other similar proportions to those which the vibrations of the notes bear to one another in musical composition, or a part of one, such as a common chord. It does not (I need not say) follow that Mr. Hay's is a correct view, but it is reasonable, I humbly submit to you, to say, that a very careful treatment of the subject, such as his certainly is, claims the most serious and respectful attention of all concerned with arts of design.

The lecturer then described the system,—briefly as follows:—He first grouped the figures, viz., the primary right-angled triangles, which are identical with those of Plato, into three classes, arranged according to whether the relations of the angular proportions of these triangles involved the relations of the numbers 2, 3, or 5 (the harmonic primaries): out of these rectangles, so classified, proceed corresponding classes of ellipses.

He then proceeded to show how, out of these rectilinear and curvilinear figures, forms of admitted beauty might be constructed.

The examples he selected included the front of the Parthenon, in all its principal features; several instances of leaves of plants; certain of the purest of Grecian architectural mouldings; diaper designs of great beauty and variety; and, finally, the proportions of the human skeleton.

In the course of his remarks on the Parthenon, he took occasion to say, that recent and accurate investigations, about to be published, place it beyond doubt that geometry, in its subtlest forms, presided at the cutting of every stone of the Parthenon; from which he argued, after the example of the Greeks, that geometry was essential to the successful practice of the art of design.

After describing the system, the lecturer continued,—

I do not bring those examples which have been cited as *proving* the powers of Mr. Hay's rules to produce the admitted beauty of the forms these examples represent. To be frank with you, I have, personally, doubts on the subject. I doubt, for instance, if there are not several other mathematical curves which will, even more closely than the elliptical curves to which Mr. Hay draws our attention, give us the primary lines of many beautiful, natural, and artistic objects. Nevertheless, if Mr. Hay's ellipses will give us a fair approximation to several objects, as they appear *primâ facie* to do, such, for instance, as architectural mouldings, where we are at present confessedly without rule to guide us, they are worthy of all respect. There are other points on which I could express doubts, arising probably from my own ignorance. To put all these points beyond doubt, would require a closer investigation than my leisure allows me to give to the subject. But it is precisely this that I would wish each of you to do for himself.

I think you will agree with me in considering that the results we have been examining are sufficiently striking to merit grave consideration. We are aware of the want of similar principles to which we may refer such harmonious sensations of the eye as those which we possess, and to which we are able to refer the harmonious sensation of the ear in the laws of music. We need some simple rules and tests to assure us of what is good and beautiful in form as thoroughly as we are assured of what is good and sound in music. We need something to relieve the designer from the exacting caprice of the changeable taste of the day,—some law to which he may appeal as decisive upon the harmonious symmetry of the form he has designed. We have the highest authority for believing that such a law lies not far from the surface, and was perhaps known to a portion of the ancients, but is lost to the moderns, to which we may not unreasonably attribute the admitted inability of the moderns to produce original designs in objects of form which will bear comparison with the ancients. All this, I submit, should induce us to follow up the inquiry in which Mr. Hay has so ably led the way; and whatever the result of your inquiries may be as to the accuracy of Mr. Hay's views, of this you may rest assured, that by familiarizing yourself with the combinations of the geometrical figures and the application of the principle of simple proportion constantly recurring in nature, you are educating the *mind*, the hand, the eye, in the true elements of design; and when you have done this for a while, you will be led to confess the truth of Field's words when he says, "The infinite wisdom that contrived these beautiful elements (the primary geometrical figures) has fraught them with admirable properties wonderfully suited to exercise the logical intellect of the geometrician, and to the disclosure of infinite utilities for the advancement of all arts and the benefit of mankind."

WILME'S SYMBOLIC MAP OF LONDON.*—The object of this map, just now published by Mr. Wilme, is to direct visitors to the lions of the metropolis, all of which are pointed out by perspicuous marks explained at the foot. The appearance of the map is injured by the splotchy red spandrels in the corners.

* London: Baily, Brothers.

THE SEVEN PERIODS OF CHURCH ARCHITECTURE.

THE high reputation of THE BUILDER, and its large circulation amongst a class of persons who have not always the opportunity of testing for themselves the statements which it contains, renders it very desirable to avoid inserting anything as a fact which cannot be proved to be really such. It is for this reason that I observe with regret that you have given currency to Mr. Sharpe's theory of "Seven *Periods* of Church Architecture," without expressing any doubt as to whether they will stand the test of examination by history or not. Mr. Sharpe's divisions are so obvious, so easy, and so natural, that the merest tyro in looking through the plates of windows in the Glossary, or any other popular series, must almost necessarily make them for himself; and it is much to be regretted that these divisions were not successive periods, but were frequently contemporaneous, as is easily proved by well-known examples and well authenticated dates. If I am not trespassing too much on your space, I will, with your permission, run rapidly through each of his *periods*, and show that this is the case.

1. *Saxon Period.*—The observation of Mr. Rickman that we have very few buildings known to be more than a very few years earlier than the Norman Conquest, has never been answered; and many of the buildings which it is now the fashion to call Saxon, there is every reason to believe were really built after the Conquest, as for instance, the towers at Lincoln in the low town, built on ground which was drained from the marshes after the Conquest, when the inhabitants were driven out of the fortified town at the top of the hill, to make room for the Norman castle and cathedral, which together occupied half of the site of the original town. The history of this period is, however, too obscure to be worth disputing.

2. *Norman Period*, 1066 *to* 1145.—What possible ground can Mr. Sharpe find for making the use of this style terminate at this particular date? which excludes one-half of our finest and richest Norman buildings, as Iffley Church, built about 1160; Peterborough Cathedral, transept and nave built between 1155 and 1177, by Abbot Waterville; Bishop Alexander's fine west doorways at Lincoln; and many others which it would be tedious to enumerate.

3. *Transitional Period*, 1145-1190.—This begins just thirty years too early: the earliest authenticated instance of the transition of style in England is the Choir of Canterbury, begun in 1175. Occasional instances of the use of the pointed arch may be found earlier, and indeed throughout the Norman style, as in the Church of the Crusaders at Jerusalem, built about 1100, to say nothing of Sicily; but the pointed arch *alone* is no proof of transition of style, which is characterised by a greater lightness of work, a superior finish in the details, and a change in the forms of *all parts*, not in the arches of construction only, the form of which at all periods was dictated by convenience.

4. *Lancet Period*, 1190-1245.—The latter date excludes the celebrated Five Sisters at York, in the north transept, built between 1250 and 1260. The first excludes Becket's Crown at Canterbury, built in 1184, the windows of which are as perfectly lancet-shaped as any others that can be cited. But the question here is not one of date only. Lancet-shaped windows were so very convenient, and so elegant at the same time, that they were used for a much longer period than Mr. Sharpe assigns to them, contemporaneously with windows of other forms. They are found occasionally in all the styles, especially in towers.

5. *Geometrical Period*, 1245-1315.—This includes part of two of the established styles—the Early English and the Decorated. The idea is not a new one: the same division, and the same name for it, was proposed by Mr. Freeman to the Oxford Architectural Society in 1842. That society very properly declined to adopt it, on the ground that "it is impossible to define such a style." It applies to the windows *only*, the other members of a building do not agree with this division—doorways,

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